LEAN AND THE LEARNING ORGANIZATION

IN HIGHER EDUCATION

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Canadian post-secondary institutions are seeking enhanced efficiencies due to ongoing funding shortfalls and expanding teaching, research, and service mandates. These institutions have considered or enacted Lean methodology based on results reported by public service and healthcare organizations worldwide. Lean requires a high level of organizational investment, including an investment in culture, to ensure success. This literature survey highlights linkages between Lean and organizational learning and presents recommendations about how institutions can plan and assess Lean improvement initiatives.

Introduction

Lean methodology originated at the Toyota Motor Corporation while Japan recovered from World War II (Dennis, 2007; Womack, Jones, & Roos, 1990). Philosophically, Lean focuses on waste reduction and respect for the workforce (Ohno, 1988; Womack & Jones, 1996) while its methods include tools such as kaizen exercises, value stream mapping, and a variety of workplace efficiency tools (Dennis, 2007; George, Rowlands, Price, & Maxey, 2005).

Despite Lean methodology's manufacturing origins, it has increasingly been used in distributed service organizations with very different missions, such as government, healthcare, and higher education. Lean was applied in healthcare and government before higher education institutions; business schools within universities were earlier adopters than whole institutions (Radnor & Bucci, 2011). Universities and colleges have benefitted from Lean projects in a number of service areas including admissions, the administration of research funds, hiring, and

nearly any functional area where multi-step processes can be simplified and focused on the needs of the users served by the organization (Balzer, 2010; Langer, 2011).

The learning organization is more difficult to define as definitions are divergent (Garvin, 1993), systems or engineering-based (Senge, 1990), or irreconcilable (Kim, 1993; Simon, 1991). Learning organizations model human learning potential and have gained attention due to the strategic and operational advantages such an organization possesses. It has been proposed that tensions exist between individual learning and organizational learning (Antonacopoulou, 2006; Bolman & Deal, 2008) and that social and community aspects are necessary to achieve lasting organizational effects (Brown & Duguid, 1991; Wenger, 1998).

This paper takes a first step toward connecting theory concerning Lean methodology and the learning organization. It does so through the lens of one organizational type, institutions of higher education, to sharpen and particularize conclusions and recommendations. With an increasing number of Canadian post-secondary institutions implementing or considering the use of Lean, it is timely for administrators to gain background on the methodology, its connection to organizational learning, and the possible ramifications for institutional goals and culture.

The methodology employed in this paper was a literature survey, basic in terms of a research approach, but useful as a starting point for current understanding and seeding future research. Publications about Lean, the concepts it is based upon, and Lean in higher education were reviewed in order to establish connections between Lean and the learning organization. Context and explanation were added where appropriate to allow the reader to determine the strength of connections for themselves. Themes and discussion are presented with analysis, as well as a discussion of the cultural implications for organizations implementing Lean methodology or enhancing the learning organization.

Lean Further Explained: Methodology and Methods

Lean methodology aims to reduce waste and inefficiency by eliminating work processes that have no effect on client experiences or product quality (Womack & Jones, 1996). It is worth considering the difference between Lean methodology and Lean methods using a parallel from the social sciences. Creswell and Plano Clark (2011) claimed *methodology* carried "philosophical assumptions that guide the direction of the collection and analysis" (p.5), while *method* focused on doing the work—following the appropriate research steps over a "single study or set of studies" (p.5).

A similar understanding of Lean can be developed where *Lean methodology* carries the philosophical assumptions that guide improvement while *Lean methods* are the tools used in a particular improvement project or series of projects. The literature about Lean does not present this distinction clearly; through its use, understandings about Lean are simplified. In this paper, where Lean is simply used by itself, it refers to both Lean methodology and the Lean methods used to promote organizational improvement.

In the 1950s, Toyota leadership realized that mass-production techniques would not work at their company and developed an early version of Lean as an alternative. By analyzing mass-production settings in depth, including visits to U.S. automotive manufacturers, Toyota officials realized that two significant limitations existed within mass production: first, employees were disengaged since they focused on boring, repetitive tasks; second, the process itself was fraught with waste levels that would be too high (thought to be 95%) to be acceptable in Japanese manufacturing (Womack, Jones, & Roos, 1990).

Lean methodology has five factors: *specifying customer value* by gaining a better understanding of their requirements, *identifying the value stream* for each product or process providing that value (while eliminating waste), ensuring *product or process flow*, introducing *pull between all steps to ensure continuous flow* (rather than "push" which creates unneeded inventory), and *managing toward perfection* in terms of quality and delivery time to customers (Womack & Jones, 1996).

There are a number of tools considered to be Lean methods that were developed as part of the Toyota Production System (TPS). Examples of such methods are:

1. a *kanban* process, which uses brightly coloured cards to signify areas of production that will require more parts—thus controlling inventory levels;

2. a *poke-a-yoke*, which is an innovation meant to make the introduction of errors unlikely (for example, designing two machine parts that can only be combined in one exact way);

3. a yellow *andon cord*, which is used on the assembly line to allow any worker at any time to halt production and meet with peers to assess problems and determine solutions; and

4. a *kaizen* exercise, which improves departmental processes in small, cross-functional teams over a 5–10 day time period.

The Learning Organization

Definitions of learning organizations are divergent. Garvin (1993) claimed that finding a singular description of such organizations has "proved elusive over the years" (p. 79). De Geus first used the term "learning organization" (de Geus, 1988), describing it as analogous to living entities with learning traits (de Geus, 1997). He also noted that, in such organizations, planning should be considered equivalent to learning (de Geus, 1997).

Senge defined the learning organization as "a group of people working together collectively to enhance their capacities to create results they really care about" (Fulmer & Keys,

1998). In *The Fifth Discipline*, Senge (1990) set out component technologies (disciplines) that are required for learning organizations: namely, systems thinking, personal mastery, mental models, shared vision and team learning. Systems thinking was defined as the *Fifth Discipline*, thought to be "a conceptual framework, a body of knowledge and tools that have been developed over the past fifty years to make the full patterns clearer and to help us see how to change them effectively" (p. 7).

Levitt and March (1988) defined organizational learning as, "routine-based, history-dependent, and target oriented" (p. 319), using the natural metaphor between an individual's learning capacity and that of the organization. Just as individuals need routines for intelligent action, so does the organization. The parallels of learning by experience, learning by doing, and a need for institutional memory are apparent, but complicated by the dispersion of organizational decision-making. Single-loop learning (Argyris & Schon, 1996) and competency traps, barriers to organizational learning for cases where established practice has been adequate to ensure basic success (Levitt & March, 1988), can further restrict improvement if there is no compelling reason to seek change.

Levitt and March (1988) further defined organizational learning using stories, paradigms, and frames to form a simulacrum of experiences lived by an organization's actors, enabling observers to form impressions of what happens within an organization. They claimed that organizational learning success is ambiguous and learning can be, in fact, superstitious; perhaps leading a manager to not buy products from a certain company because of past experience or impressions obtained from others. Institutional memory was presented as a challenge, as not all experiences can be recorded and later shared. They connected their concepts with DiMaggio and Powell (1983), who defined organizational information sharing as coercive

(commonplace as a competitive advantage), mimetic (copied from others), or normative (routine based on human interaction). DiMaggio and Powell presented the concept of *institutional intelligence* with specific recommendations of how organizations should enhance their learning capacity.

Bolman and Deal (2008) noted tensions between individual and group learning in learning organizations. They emphasized the usefulness of Senge's learning organization systems model while cautioning that it is occasionally difficult for organizations to sense the relationship between learning cause and effect. This can be due to proximity (Did the learning improve a distant part of the organization?), time (How do we know if learning affected this year's financial results?), or complexity (How can we be sure we have learned anything at all?).

Some authors have addressed the phenomenon of the learning organization by theorizing about how shared learning (or even just information) is socially constructed (Brown & Duguid, 1991). This shared learning must have a purpose to persist and evolve from "merely acquiring stuff to learning as a changing relationship of participation in the world" (Wenger, 1998). *Communities of practice* form and dissolve to further an organization's interests, or to build meaning and worldviews for community members to help them navigate daily affairs or organizational complexity (Brown & Duguid, 1991; Lave & Wenger, 1991).

Lean in Higher Education

Lean methodology has become more common in higher education institutions to reduce waste, streamline processes, and re-engage a workforce fatigued from the effects of the 2008 financial crisis (Balzer, 2010; Finn & Geraci, 2012; Radnor & Bucci, 2011). Universities and colleges operate in a climate of uncertainty and face an increased scope of mission, unstable

enrolments, costs that are outpacing inflation, and diminished government support (Association of Universities and Colleges in Canada, 2012). Universities and colleges are seeking greater efficiency in their academic programs and service delivery areas and are making decisions to prioritize key areas (Dickeson, 2011). Further, Houston (2008) posited that higher education has moved from a model focused on accountability to one focused on improvement, and Lean methodology is increasingly seen as a central strategy for improvement.

A number of articles, books and technical reports have been published relating to the implementation of Lean in higher education. Recent and relevant publications are presented here to describe the nature of current scholarship and findings.

Balzer published *Lean Higher Education: Increasing the Value and Performance of University Processes* (2010), which contained practical advice, case studies, and theory about how Lean should be implemented in higher education. He defined Lean in higher education (LHE) as defining the value of processes from the perspective of beneficiaries, identifying process flow (does each step and activity in the process add value?), eliminating the types of waste that add no value, making processes flow smoothly, and pursuing perfection through a combination of continuous improvement and radical transformation of the process (p. 25). This definition aligns closely with the model used in the Toyota Production System (TPS) chronicled by Womack and Jones (1996).

Balzer (2010) provided examples with flow diagrams and value stream mapping that showed where processes break down due to wasted material or time. He also highlighted where Lean was effective in improving campus functions thought to be inefficient (i.e., student enrolment, move-in process for student residences, changes to the physical plant). Balzer described best practices to establish LHE administrative structures and accommodate cultural

considerations. Institutional case studies were provided for initiatives at the University of Central

Oklahoma (UCO), the University of Iowa, the University of New Orleans, Bowling Green State

University, University of Scranton, and Rensselaer Polytechnic Institute (RPI).

Balzer (2010) concluded that LHE is effective for the improvement of processes well

suited for Lean (e.g., administrative units, high transaction areas). LHE requires cultural

sensitivity and willingness for employees to work across different departments and

administrative levels. He described the differences between local Lean initiatives (departmental)

and wider-scale (institutional) implementations.

Comm and Mathaisel (2003) published a paper that recognized an increased presence

of Lean at universities to help them compete at a global level, rather than national or regional

level. They argued that metrics (such as Kaplan and Norton's balanced scorecard) are useful

when establishing quality standards—and are particular to customer perspective, internal

perspective, people, and the financial perspective (Kaplan & Norton, 1996). Similar to Balzer's

approach, Comm and Mathaisel (2003) used the concept of value stream mapping to analyze

areas that can be improved via Lean methodology.

Comm and Mathaisel (2003) proposed a Lean enterprise sustainable framework based

on nine operating principles adapted from Nightingale (1999). These were described as the

degree of sustainability; degree of Leanness; specific Lean improvements, initiatives, and best

practices (including collaboration and outsourcing); factors that encourage or discourage Lean

operations; communication of best practices; and the application of overarching principles.

Comm and Mathaisel (2003) concluded that since public and government expectations of post-

secondary institutions have changed from accountability to improvement, the use of clear metrics

and an analysis of customer (i.e., student) expectations were essential to ensuring successful organizational improvements.

Comm and Mathaisel published two additional research papers about Lean in higher education in 2005. Their first presented results from LHE case studies at a number of New England universities (Comm & Mathaisel, 2005a). The authors argued that no established quality measurement technique existed at that time in post-secondary education (with the possible exception of a per-student cost). They used their previous 2003 framework to describe differences about how public and private universities were evaluated.

While the term *case study* appeared in the title of their paper, the authors used a survey approach to obtain opinions (or perceptions) about Lean implementations from university administrators charged with leading them. They noted that, at some schools, improvement projects are not referred to as Lean initiatives, and the choice of technology has a significant impact on overall improvement. Lean projects do not emerge spontaneously and require continued sponsorship from the most senior administrators (i.e., presidents and chancellors) to be successful and sustainable.

Comm and Mathaisel (2005b) later presented results of an exploratory study to determine best practices for Lean in higher education. They surveyed the same New England-based university and college administrators from their previous study. Basic themes were developed leading the researchers to conclude that Lean initiatives were effective in the view of the administrators surveyed, and are best implemented by educating employees on core Lean concepts. Comm and Mathaisel (2005b) recommended applying Womack and Jones's (1996) five Lean principles, defining appropriate metrics for success and continuing to develop outsourcing, collaboration programs, and other technology initiatives.

Finn and Geraci (2012) published a research brief describing Lean implementations at four universities. They presented information about why institutions had chosen a Lean approach as members of an executive roundtable (Education Advisory Board) concerned with the oversight of university financial affairs. They observed that executive-level leaders typically introduced Lean initiatives and external consultants were often hired to oversee projects. Lean projects typically aimed to reduce the amount of time and resources required for processes, standardized processes across departments, or improved the quality of processes. In all four cases, oversight of Lean projects occurred through a central office concerned with quality initiatives, staffed by either faculty or staff members.

Finn and Geraci (2012) noted that Lean projects typically involved assembling a five to eight member project team (including staff members directly affected by processes), mapped the state of processes while identifying problem areas, mapped the future state, and created an implementation plan to enact changes and later assess progress. They concluded that Lean projects enabled institutions to save time and resources, improved the quality and accuracy of processes, and improved employee relations and satisfaction levels. Lean projects required between two and eight months to complete, depending on their complexity (Finn & Geraci, 2012).

Radnor and Bucci (2011) produced a research report titled *Analysis of Lean Implementation in UK Business Schools and Universities* for the Association of Business Colleges (ABC), a business school advocacy group in the UK (ABS, n.d.). The report focused on five case studies (Cardiff University, Nottingham Business School, Portsmouth Business School, the University of St Andrews, and Warwick Business School) to synthesize how Lean was being

used in higher education, where it came from, and the experiences at these schools, including predictions about future Lean initiatives.

The report was based on a research study employing questionnaires sent to university officers concerned with Lean initiatives. Additionally, case studies were developed to capture experiences with Lean at three UK universities. Data analysis involved the development of themes from interview transcripts and case studies; verbatim text was used to highlight key points in the report's text.

Radnor and Bucci (2011) presented three common advantages experienced by organizations that undertook Lean initiatives: "creating an understanding of the need to change, revising processes and practices which had been untouched for years and engaging staff to enable them to challenge and question their working practices" (Radnor & Bucci, 2011, p. 9). These authors reported that Lean in higher education was in a nascent stage, implementations were fragmented (i.e., difficult to assess), and early adopters saw significant results for process improvement and employee engagement. Organizations reported that Lean was understood only in a limited way by staff members, restricting ways in which it could be implemented. The main personnel involved with Lean tended to be administrative and support staff, as they could more readily observe and directly experience results. However, these same staff members noted that the daily distraction of ongoing job responsibilities was a barrier when implementing Lean.

Organizations reported improvements in certain projects or departments but there was less emphasis on creating a culture to support Lean. Participants felt there was a need to better develop the building blocks (i.e., methods and tools) of Lean. They suggested further senior management involvement to link Lean to corporate strategy and a better overall understanding of customers and processes. Employees believed that when Lean adds value to internal processes, it

benefits them and other employees. Organizations reported more work would be required to link the perceived value of these improvements to external actors and students in particular. Certain organizations envisioned moving from pilot projects to projects more integrated within the university to enhance results and develop a culture of improvement.

The Theoretical Link: Discussion and Visualization

Dennis (2007) connected the use of organizational standards to learning. Through documentation, knowledge sharing, and clearly defined standards, any organization can do well even if key employees leave or change positions. He stated that the learning organization does not truly exist unless there are "management systems that record and share important learning points" (p.123). Deming (1986) made an interesting reference to the link between quality initiatives, teamwork, and the learning organization. When describing factors of success for quality teams he noted, "a good team has a social memory" (p. 90). While not intending to define learning organizations, he did provide a concise and useful alternative definition.

Senge (1990) provided the most poignant link between Lean and the learning organization by declaring *systems thinking* to be the fundamental key (or *fifth discipline*) to organizational learning. He presented the first four disciplines in his model as *continual mastery* of one's profession and related philosophy, *mental models* to establish meaning within the workplace and world we live in, building a *shared vision* among employees, and *team learning* to get at the heart of organizational efficiency with the highest involvement of all employees. Lean methodology is based on a number of concepts that relate to systems and systems engineering, so seeing a fundamental link here is not surprising.

Emiliani (1998) claimed, "Lean production, applied correctly, results in the ability of an organization to learn" (p. 616). In the same paper, he noted that it is possible to consider employee behaviours to be characterized as Lean; by avoiding office politics and other wasteful activity, organizations could realize significant gains. Bowen and Spear (1999), commenting on the Toyota Production System (TPS), observed, "the system actually stimulates workers and managers to engage in the kind of experimentation that is widely recognized as the cornerstone of a learning organization. That is what distinguishes Toyota from all the other companies we studied" (p.97).

Lean methodology has been explained in a diagrammatic form in several different ways. One prevalent and useful model is the "House of Lean" diagram expressed in Figure 1.
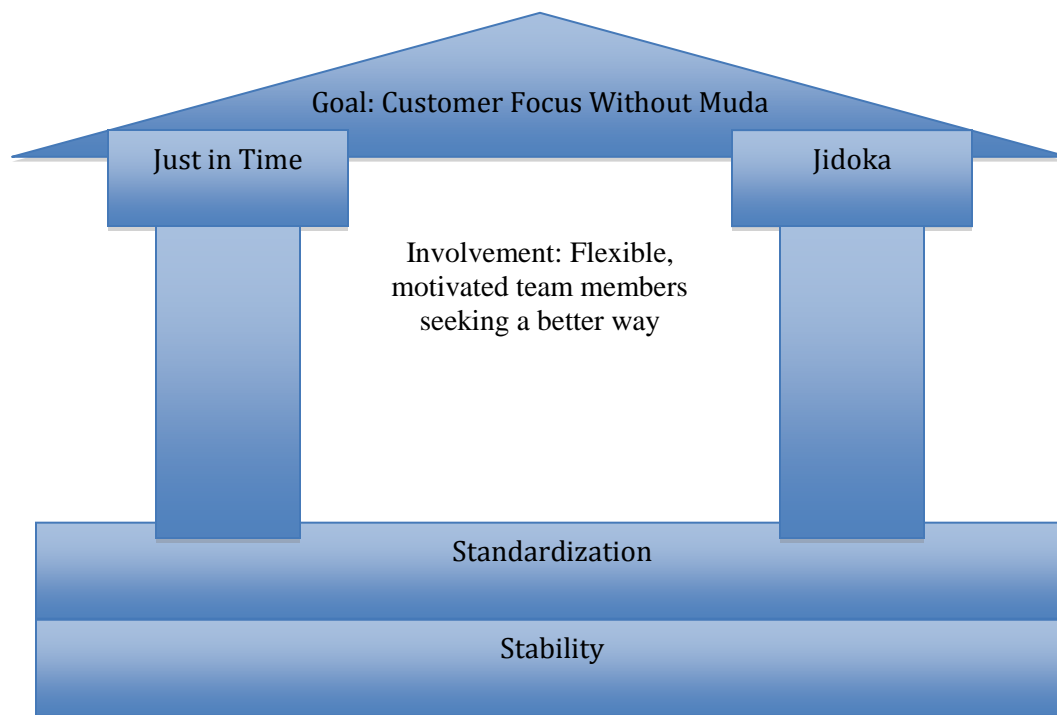

Figure 1. House of Lean model (adapted from Dennis, 2007)

The philosophy of Lean methodology is evident in this depiction; its *methodology* is evident from the base of the "house" straight up through the centre of the figure. Its *methods* hold

the structure in place on each side; with "just in time" (left hand column of diagram) representing

a control on inventory waste and "jidoka" representing the activities of workers and machines

making continuous adjustments (right hand column of diagram) to eliminate errors (Toyota

Motor Corporation, Operations Management Consulting Division, 1995). The peak (roof)

represents an understanding of value from the perspective of the customer and the elimination of

waste ("muda" in Japanese), while the center/core represents the flexible involvement of all

employees.

The intersection of Lean and the learning organization can be visualized in Figure 2.
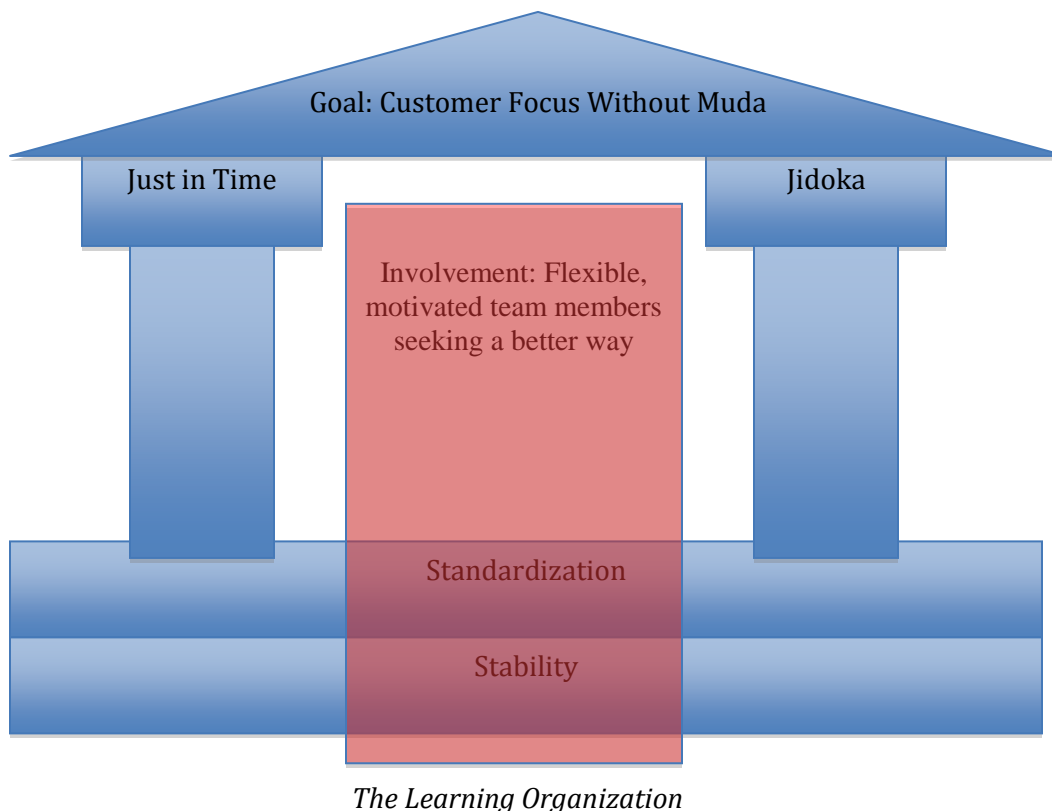

Figure 2. House of Lean model showing the intersection with the learning organization (red)

I am implying that the theoretical link can be visualized and conceived as follows:

organizational learning lies at the heart of any successful Lean implementation. This link is

evident in post-secondary education. Major aspects of university and college structure and

culture can be observed in the "red zone" (Figure 2): *stability* speaks to tenure and promotion practices, while *standardization* speaks to institutional policy on admissions, credit transfer, and degree granting. The usual collegial governance model at universities is seen in the centre: active involvement from faculty, staff and students, administrators, and the community to direct the affairs of the institution. Dialogue and collegiality in the learning organization "permits colleagues to mutually explore their fields of knowledge and reflect upon what they have learned" (Shaw & Perkins, 1991), which could ease integration into university and college governance models. Institutional efficiency or effectiveness initiatives that fail to acknowledge or accommodate this intersection of ideas and culture will not succeed or at best suffer sub-optimal results.

Implications for Organizational Culture

Schein (1990) defined culture as "what a group learns over a period of time as that group solves its problems of survival in an external environment and its problems of internal integration" (p. 111). There is no question that Lean implementations in higher education (or other settings) will not succeed without an accommodation and understanding of the culture and subcultures they serve.

It is interesting to consider that in the original Toyota Production System (TPS) very few procedures were written down (Ohno, 1988). This was possibly due to the organizational model Toyota was operating under: in order to ensure financial sustainability at Toyota in the 1950s, a deal was struck with the union to drastically reduce the number of employees—however, remaining employees were offered lifetime employment (Dennis, 2007). Additionally, employee pay scales were indexed to seniority along with bonus options based on company

performance. Without these factors in place, employee turnover may have necessitated formal

knowledge storage and sharing practices at Toyota.

It is interesting to consider what a formal learning organization strategy would have

looked like during the development of the Toyota Production System (TPS). Would the

methodology and methods have enhanced speedy knowledge transfer and retention—or would

they have restricted not only *flow* (core to Lean production) but also innovation to the point that

Lean methods could not have emerged? It is doubtless that a culture of innovation—tempered by

trust and time invested in having employees embrace and continually develop Lean—was key to

making Lean methodology and methods possible at Toyota.

Universities and colleges feature organizational structures described by Mintzberg

(1983) as professional bureaucracies and machine bureaucracies. Faculty members are highly

trained, autonomous professionals with a unique collegial culture that values creativity and

collaboration—this fits the professional bureaucracy structure. University and college non-

faculty employees are highly trained (and also work within a collegial culture), but operate on

the more typical machine bureaucracy, or top-down management, organizational structure.

Administration typically must operate through both structures, and holds power to align with a

machine bureaucracy as necessary. Clashes of cultures occasionally occur between these

structures and groups—and that is before considering the involvement of boards of governors,

governments, and students.

When subgroups (mainly those who operate on the front line, those who engineer

systems, and those who lead) are isolated from each other during change, cultures will collide

and failure occurs (Schein, 1996). This is a key point of consideration for both Lean

implementations and enhancements of the learning organization; both are dependent on clear,

honest communication between all groups, including the efforts of those leading performance enhancement initiatives, such as Lean. In university and college cultures, policy development and the setting of standards can be resisted as being diametrically opposed to the creative process; however, Bowen and Spear (1999) claimed (perhaps paradoxically) that at Toyota it is "that the rigid specification is the very thing that makes the flexibility and creativity possible" (p.97).

During my literature survey, I was surprised that I did not find published articles, opinion pieces, monographs, or books that were critical of the application of Lean in improving services at higher education institutions. Culturally, there can be hesitation, debate, or even militancy from staff and faculty when change is proposed in higher education (or any organization for that matter). Objectively, it appears that Balzer's (2010) framework for using Lean is directly mapped from the Toyota Production System (TPS) steps chronicled by Womack and Jones (1996). While this is not necessarily problematic, the question could be asked, "Why is there not a more appropriate variant of Lean methodology to accommodate the unique cultural and functional requirements for institutions of higher learning?" Universities and colleges are comprised of highly skilled professionals, academic or otherwise—including engineers and project management professionals. It is not inconceivable that groups of such faculty and staff could develop their own type of methodology that would better suit their needs and the needs of the constituencies served by their institutions.

Conclusions, Recommendations, and Future Study

Lean methodology and the learning organization are closely linked through their core philosophies and methods. As I have presented, there are a significant number of references in the literature showing this, but very few regarding what should be done about it for further research or professional practice. In this section, I present recommendations for organizations that are considering or pursuing Lean implementations or further enhancement of organizational learning, whether they are institutions of higher education or not:

1. Executive Leadership—Executive sponsors need to increasingly understand complex phenomena such as Lean and the learning organization to understand how it fits the short and longer-term goals of their organizations. They will need to instantiate these organizational improvements themselves and also know when to back off, so the grassroots of the organization will become involved to foster and continue them. Ensuring a culture of trust will be a primary objective to encourage initiatives of this level of complexity. Presidents will have to build a culture where "everybody is involved with continuous improvement every day" (Sinha & Mishra, 2013) and not allow the enthusiasm for Lean methodology to fade over time.

2. Training and Development—Lean implementations involve significant training for staff assigned to improvement teams. Training should include the organizational learning philosophy and information about how Lean integrates with this for both theory and practice. Visualizations may be effective in conveying understandings about Lean and the learning organization. Levitt and March (1988) recommended stories, paradigms, and frames to form a simulacrum of the lives lived by people in organizations; such tools could be useful for developing training about Lean and the learning organization.

3. Knowledge Management—Lean implementations provide a fresh opportunity to consider how the organization handles knowledge management: from the "easy" (document management or storing of policy) efforts to the "difficult" efforts (succession planning, knowledge transfer or competency mapping).

4. Information Technology (IT)—When Lean is implemented, IT systems should be harnessed to ensure information sharing and creative options for collaboration and the sharing of results. IT leaders must not sacrifice knowledge sharing to attain impenetrable network security; they should remember that Toyota has made their methodology freely available outside of their company for decades (Womack & Jones, 1996).

5. Project Governance/Consultants—External consultants are often employed to launch new Lean initiatives or expand existing ones. These consultants should become familiar with the theory and practice of the learning organization and be able to operationalize key concepts that align with the organization's direction—and help integrate these two concepts through the projects they are involved with. This will require a significant amount of preparation time with the institution's thought leaders, key staff members, and foundational documents.

Hines and Lethbridge (2008) claimed, "effective strategy and alignment can only be delivered through strong leadership, which, in turn, will only be successfully achieved in a positive organizational culture that is receptive to learning and improvement" (p. 54). This speaks to the need for authentic and sustained executive leadership support for Lean initiatives, including a need for executives to take time to better understand Lean before deploying it in organizations. A common error is the introduction of Lean as a means of reducing costs—this is not what the methodology is about and it does not necessarily result in cost savings. Institutional leaders need to remember, "the time to embrace Lean thinking is before an organization faces a crisis and needs to change" (Womack & Jones, 1996).

While studies found in the literature about Lean in higher education are useful for both practitioners and researchers, more rigour should be applied to these publications to aid in setting research precedents for future study. Some authors claim to use a particular research methodology, but actually use a different one, making it difficult to generalize and replicate studies elsewhere. There are a number of interesting possibilities in quantitative, qualitative, and mixed methods to advance some of the findings in this paper to develop new models of Lean and the learning organization based on what is currently happening in organizations. Despite this, practitioner reports should not be discouraged, as they provide valuable (and rapid) information to both the practitioner and research community.

Universities and colleges have unique capacities for producing original research and are incented to produce it in timely, rigourous ways that many other organizations would find difficult to match. The prospects for new research programs concerning the use of Lean in higher education are strong; such programs would help not only ensure business continuity in the higher education sector but new linkages with worldwide institutions in education and industry.

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